

## Chapter 11

### Risk Premium

The risk premium method of determining the cost of equity, sometimes referred to as the "stock-bond-yield spread method" or the "risk positioning method," or again the "bond-yield plus risk-premium" method, recognizes that common equity capital is more risky than debt from an investor's standpoint, and that investors require higher returns on stocks than on bonds to compensate for the additional risk. The general approach is relatively straightforward: First, determine the historical spread between the return on debt and the return on equity. Second, add this spread to the current debt yield to derive an estimate of current equity return requirements.



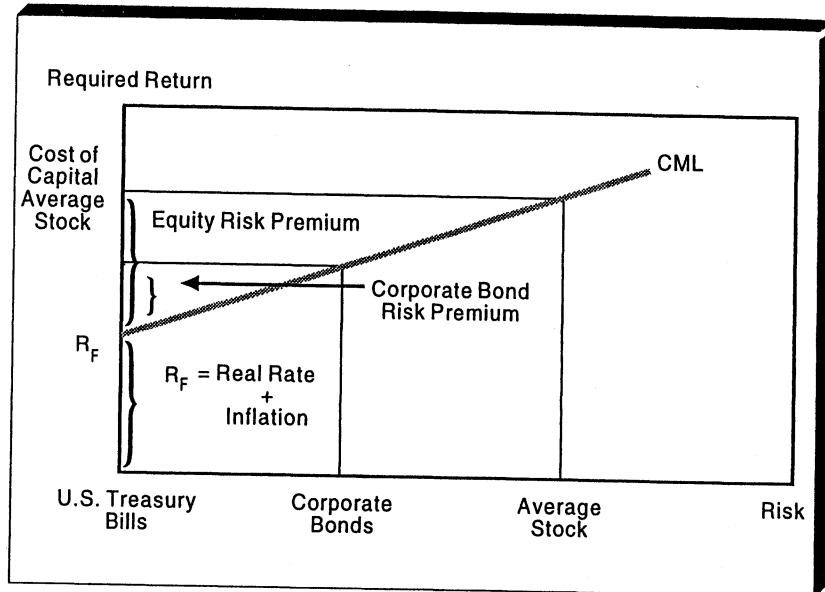
The risk premium approach to estimating the cost of equity derives its usefulness from the simple fact that while equity return requirements cannot be readily quantified at any given time, the returns on bonds can be assessed precisely at every instant in time. If the magnitude of the risk premium between stocks and bonds is known, then this information can be used to produce the cost of common equity. This can be accomplished retrospectively using historical risk premiums or prospectively using expected risk premiums.

#### 11.1 Rationale and Issues

The basic idea behind the risk premium approach is portrayed graphically in Figure 11-1. The horizontal axis measures security risk; the further to the right a security lies, the greater its investment risk. U.S. government securities are shown at the origin since they are devoid of default risk. The vertical axis portrays the required returns. The straight line, labeled the capital market line (CML), shows at a point in time the risk return tradeoff in capital markets, that is, the relationship between a security's risk and its required return. The term  $R_F$ , which stands for "risk free," designates the rate of interest on default-free securities as measured by the rate of interest on U.S. Treasury bills.

Corporate bonds are riskier than U.S. Treasury securities, so their yields are higher. The risk premiums rise for lower quality corporate bonds. Therefore, the risks on corporate bonds are plotted higher than the risks of U. S. Treasury securities on the Capital Market Line, and their required returns are correspondingly higher. Common stocks are riskier than corporate bonds, and returns on stocks are correspondingly higher.

**FIGURE 11-1**  
**THE RELATIONSHIP BETWEEN RISK AND RETURN IN CAPITAL MARKETS**



The Capital Market Line demonstrates the linkages between various segments of the capital market. Investor capital flows between the various markets depending on the risk-return relationship for each market segment, and the return for each type of capital increases with the risk of the security. Relative risk premiums, RPs, corresponding to the slope and shape of the Capital Market Line at a point in time, exist for each type of security as follows:

$$\text{AAA Corporate Bond Yield} = \text{U. S. Treasury Bond Yield} + RP_1$$

$$\text{BAA Corporate Bond Yield} = \text{AAA Corporate Bond Yield} + RP_2$$

$$\text{Preferred Stock Yield} = \text{BAA Corporate Bond Yield} + RP_3$$

$$\text{Common Stock Return} = \text{BAA Corporate Bond Yield} + RP_4$$

The magnitude of the relative risk premiums is determined by shifts in demand and supply in each capital market segment, which are in turn driven by investors' attitudes toward risk, and by the relative risk differentials perceived by investors between each type of security.

Notwithstanding that must be remembered: measure the measure of risk premium be measured on the market line at a point in time. Can be answered? Or established? Show returns? What is

Second, we must measure the risk premium constant impact on the market line remain and falls in response in fact constant? the factors that other way, is involved

Third, we address the risk premium requirement derived from the risk of a given security offered in the market

## 11.2 History

One approach to measuring returns actually measure the risk premium is simply on stocks and bonds

$$K_e$$

where  $K_e$

$$K_d$$

For example, if the difference between stocks and bonds

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average yields of seemingly comparable securities or even in deductions drawn from recent sales of issues authorized by this same commission. Yields of preferred and common stocks are to be considered, as well as those of the funded debt. When bonds and preferred stocks of well seasoned companies can be floated at low rates, the allowance of an over all rate return of a modest percentage will bring handsome yields to the common stock. Certainly the yields of the equity issues must be larger than that for the underlying securities. In this instance, the utility operates in a stable community, accustomed to the use of electricity and close to the capital markets, with funds readily available for secure investment. Long operation and adequate records make forecasts of net operating revenues fairly certain. Under such circumstances a six per cent return after all allowable charges cannot be confiscatory. \*

(3) and (4). The utility urges that two items of expense and a prospective loss should be added to the operating expenses, allowed by the commission, of \$1,382,829. The most important of these items is the rate case expenses. The company by its Exhibit 21 shows these incurred to November 15, 1937, to be 78,374.50. The commission from Exhibit 23 found them to be \$127,935 for the twelve months ending September 30, 1937. The difference probably comes from the expenses before and after the period considered by the commission. We assume the higher figures to be correct. As the commission concluded that the prior rates of the company were obviously excessive, it allowed nothing for expense in defending them. Consequently there is no discussion of the reasonableness of the amount of the company's charge and we accept them as reasonable. Even where the rates in effect are excessive, on a proceeding by a commission to determine reasonableness, we are of the view that the utility should be allowed its fair and proper

# MONTANA DEPARTMENT OF REVENUE

Direct Capitalization Rate Study  
Industry: Gas Pipelines  
2011 Assessment Year

## Equity Measures Calculated:

E/P estimates:

All	Median
5.64%	4.14%
4.77%	4.60%
5.21%	4.37%
Average of E/Ps	

## Inverse of P/E Ratios:

5.56%	4.23%	Yahoo
4.65%	4.57%	Value Line
5.10%	4.40%	Average of Inverse of the P/E
6.51%	6.25%	Inverse of median P/E, Value Line
5.16%	4.38%	Average of all above except median P/E
Mean =	5.43%	4.76%
Median =	5.56%	4.57%

Equity Measure NUOI = 5.50%

## Debt Measure Calculated, Current Yield:

Annual	4th Qtr
6.57%	6.53%
6.31%	6.27%
6.48%	6.44%
Mean =	6.45%
Median =	6.48%
ALL	
BBB- & Above	
BB- & Above	
6.41%	
6.44%	

Debt Measure = 6.50%

Industry Market Capital Structure Net Utility Operating Income (NUOI) Rate			
Equity	72.00%	x	5.50%
Debt	28.00%	x	6.50%
	100.00%		5.78%
Direct Cap Rate NUOI =			6.00%

Note violation of  
fundamental principle  
of finance.

## Gross Cash Flow / Price:

Mean	Median
8.67%	7.55%
Value Line	

Equity Measure Gross = 9.00%

Industry Market Capital Structure Gross Cash Flow Rate (GCF)			
Equity	72.00%	x	9.00%
Debt	28.00%	x	6.50%
	100.00%		8.30%
Direct Cap Rate GCF =			8.50%

# MONTANA DEPARTMENT OF REVENUE

Yield Capitalization Rate Study  
Industry: Gas Pipelines  
2011 Assessment Year

## Equity Measures Calculated:

Dividend Growth Model

Capital Asset Pricing Model

Cap. Rates in:

All	S. Dakota	N. Dakota
13.50%	11.90%	10.69%
Mean = 11.47%		
Median = 11.47%		
Equity Measure FCF = 9.50%		

## Debt Measures Calculated, Yield to Maturity:

	ALL DEBT		20 YEAR PLUS DEBT	
	Annual	4th Qtr	Annual	4th Qtr
ALL	5.13%	4.99%	6.38%	6.40%
BBB- & Above	4.42%	4.38%	6.23%	6.26%
BB- & Above	4.93%	4.81%	6.39%	6.41%
Mean =	4.83%	4.73%	6.33%	6.36%
Median =	4.93%	4.81%	6.38%	6.40%

Debt Measure = 6.30%

Yield Cap Rate Free Cash Flow - Gas Pipelines				
Equity	72.00%	x	9.50%	= 6.84%
Debt	28.00%	x	6.30%	= 1.76%
	100.00%			8.60%
Weighted Average Cost of Capital (WACC) =				8.75%

Assumed Growth Rate = Inflation  
see appendix for calculation

Growth = 2.12%

# DIRECT CAPITALIZATION OF NOI

Williston Basin Interstate Pipeline Company

Tax Year 2011

YEAR	CALCULATED NUOI	OPERATING LEASE ADJUSTMENT	ADJUSTED NUOI
2010	\$ 40,228,441	\$ -	\$ 40,228,441
2009	34,579,910	200,170	34,780,080
2008	23,324,049	204,921	23,528,970
2007	28,113,574	-	28,113,574
2006	28,326,445		28,326,445

5 YEARS SIMPLE AVERAGE NET OPERATING INCOME

30,995,502

5 YEARS WEIGHTED AVERAGE NET OPERATING INCOME

33,026,869

## BAND OF INVESTMENT CAPITALIZATION RATE

	% OF CAPITAL	RATE	WEIGHTED RATE
COMMON EQUITY	72.00%	5.50%	3.96%
PREFERRED	0.00%	0.00%	0.00%
DEBT	28.00%	6.50%	1.82%
WEIGHTED RATE	100.00%		5.78%
ASSUMED CAPITALIZATION RATE			6.00%

CAPITALIZED INCOME INDICATOR

516,591,700

EXPANSION CWIP

3,869,164

DIRECT CAPITALIZATION OF NET OPERATING INCOME PLUS EXPANSION CWIP

520,460,864

LESS: INTANGIBLE PERSONAL PROPERTY DEDUCTION

26,023,043

FINAL DIRECT CAPITALIZATION OF NET OPERATING INCOME PLUS EXPANSION CWIP

\$ 494,437,821

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# CORRELATED UNIT VALUE

Williston Basin Interstate Pipeline Company

Tax Year 2011

VALUE INDICATORS	Before I.P.P.*	After I.P.P.*
Original Cost less Depreciation	\$ → 330,630,849	\$ 314,099,307
Direct Capitalization of Net Operating Income	→ 520,460,864	494,437,821
Direct Capitalization of Gross Cash Flow	491,671,783	467,088,194
Yield Capitalization of Future Cash Flows	327,874,148	311,480,440
Stock & Debt Approach	385,974,647	366,675,915

CORRELATED UNIT VALUE	\$379,748,000	\$360,761,000
ALLOCATION FACTOR	50.6370%	50.6370%
MONTANA ALLOCATED VALUE	\$192,293,087	\$182,678,635

	<u>OCLD</u>	<u>MARKET</u>
LESS HAND HELD TOOLS	(\$2,441,749)	(\$15,000)
LESS LICENSED VEHICLES	(\$1,857,671)	(\$2,133,641)
LESS STORED GAS	(\$2,231,742)	(\$2,563,283)
LESS DOWNHOLE EQUIPMENT	\$0	\$0
OTHER DEDUCTIONS	\$0	\$0
TOTAL OTHER DEDUCTIONS/EXEMPTIONS	(\$6,531,162)	(\$4,711,924)
ADJUSTED MONTANA VALUE		177,966,711
CIAC's in MT	\$3,201,884	\$3,677,547
OTHER ADDITIONS	\$0	\$0
TOTAL OTHER ADDITIONS	\$3,201,884	\$3,677,547
TOTAL MONTANA VALUE TO BE DISTRIBUTED TO COUNTIES		\$181,644,258

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